

REMARKS

This responds to the Office Action mailed on April 6, 2005, and the references cited therewith.

Claims 1-15, 17-22 and 31-32 are pending in this application.

§102 Rejection of the Claims

Claims 1-15, 17-22 and 32-33 were rejected under 35 U.S.C. § 102(b) as being anticipated by Milanovic et al., "Micromachining Technology for Lateral Field Emission Devices", IEEE Transactions on Electron Devices, Vol., 48, no. 1, January 2001, pp. 166-173. This rejection is respectfully traversed. The art cited does not show each and every element of the claimed invention.

The Office Action does not specifically identify what portions of the reference disclose the elements of the claims. It basically indicates that "Milanovic et al. shows," and then recites the claim elements. Thus, a proper prima facie case of anticipation has not been established, and the rejection should be withdrawn.

Applicant has reviewed Milanovic et al., and has not found all the elements of the claimed invention. Milanovic et al. describes the formation of tips from the scallops of a deep reactive ion etch process. It clearly lacks the third element of claim 1, "oxidizing the columns to create silicon wires substantially corresponding to the ripples." First, there are no columns in Milanovic et al. that are oxidized. Rather, the scallops themselves in Milanovic et al. form the tips. In the third elements of claim 1, the scallops are oxidized to produce wires. This process is clearly shown in FIG.s 1, 2 and 3. FIG. 6 shows a photograph of actual wires produced. Clearly, the tips of Milanovic et al. do not correspond to the wires of the presently claimed invention. As such, a proper prima facie case of anticipation has not been established, and the rejection should be withdrawn.

In Milanovic et al., "when the mask layout defines an acute angle as shown in Fig. 1(a), two scalloped sidewalls meet at the corner of the structure and form relatively sharp tips." Page 167, III. A. The tips are not formed in the same manner as the wires are formed in claim 1. The tips of Milanovic et al., may be sharpened by oxidation as described on page 168 under B., but they are not formed by such oxidation.

The third element of claim 1 describes oxidizing columns to form the wires. Columns are not oxidized to form wires in Milanovic et al. Rather, it is the acute angle of the mask in combination with the etching that forms tips. Thus, the process, and the resulting structure are different.

Page 170 of Milanovic et al., describes the fabrication of microgrids. “SCS grids are designed in layout as very thin and modulated photoresist patterns, such that the vertical scalloping effect is sufficient to periodically etch through the structure and create airgaps.” “After a subsequent oxidation, the narrow silicon nanowires result in slightly separated atomically sharp silicon tips.” Two things should be noted from this description in Milanovic et al. First, the nanowires are created by etching through. Second, oxidation is used to produce the tips, not the wires. Thus, claim 1 clearly distinguishes from Milanovic et al., and the rejection should be withdrawn.

Claims 2-7 depend from claim 1 and distinguish the reference for at least the same reasons.

Claim 8 describes oxidizing the ripples to form nano-structures. The nanowires and tips in Milanovic et al. appear to be formed by etching.

Claims 9 – 11 describe the formation of the three dimensional array of wires with the use of intersecting lines, and wires extending between columns. This method is clearly not shown in Milanovic et al.

Claims 12 - 13 describe the formation of support pillars and wire lines between the pillars, and then creating the rippled sidewalls and forming wires corresponding to the ripples extending between the pillars. This method is clearly not shown in Milanovic et al..

Claims 14 and 15 recite that columns are oxidized to form a wire surrounded by oxide. This method is clearly not shown in Milanovic et al., and Milanovic et al. does not use oxidation to form the tips or wires.

Claims 17 and 18 recite using oxidation to form silicon tips. This is not shown in Milanovic et al., as Milanovic et al. uses etching to form tips.

Claims 19 and 20 recite oxidizing a trench to form a channel surrounded by oxide. This feature was not seen in Applicant’s review of Milanovic et al., and was not clearly pointed out in the Office Action.

Claims 21 - 22 recite etching the columns to form wires, and then oxidizing the wires to reduce spacing between the wires. Milanovic et al. oxidizes the nanowires to form tips, not to reduce spacing between the wires. In fact, in Milanovic et al., it appears that the wires are fully consumed to produce the tips.

Claims 31 - 32 recite the oxidation of a column to form a wires surrounded by oxide. This does not appear to be taught by Milanovic et al., and the rejection should be withdrawn.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6972 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

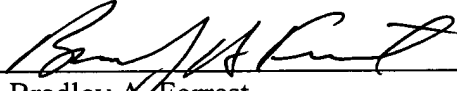
Respectfully submitted,

KANAKASABAPATHI SUBRAMANIAN ET AL.

By their Representatives,

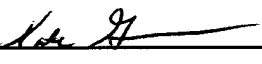
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